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Then $(1+.04t)(74200)=[(1+.08(t+\frac{1}{2}))](68900)$.

$\therefore 68900 \times .08t = 5300(1+.04t)$.

$\therefore t=1$ year. \therefore time was January 1, 1895.

$F=(74200)(1.04)=\$77168$.

II. Solution by COOPER D. SCHMITT, A. M., Professor of Mathematics, University of Tennessee, Knoxville, Tenn.

Ler x =the number of days the first note had to run, and $x+180$ the number the second had to run ; regarding 360 days to the year.

Then we have, since the face of each note was the same,

$$74200\left(1+\frac{4}{100}\frac{x}{360}\right)=68900\left(1+\frac{8}{100}\frac{x+180}{360}\right).$$

Whence, dividing by 100 and transposing,

$$53=\frac{5512x+992160-2968x}{36000}$$

or, $2544x=53(36000)-992160=915840$.

$x=360$ days, or date of each note was January 1st, 1895.

The face value must have been \$74200+the discount, which is 4% of \$74200 or \$2968 ; that is \$77168.

119. Proposed by G. B. M. ZERR, A.M., Ph.D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

The cost of an article is \$1 $\frac{9}{.100}$. The selling price is \$1,000. What is the gain per cent.?

Solution by C. C. BEBOUT, Professor of Mathematics, High School, Elgin, Ill., and J. M. HOWIE, Professor of Mathematics, The Nebraska State Normal School, Peru, Neb.

I do not think that the solution of Arithmetic problem 112, published in the August-September MONTHLY is correct. My solution of No. 119 will show wherein I differ. C. C. BEBOUT.

$$\$1.\frac{9}{.001}=\$1.+\$ \frac{9}{.001}=\$1.+\$9000=\$9001, \text{ the selling price.}$$

If the article costs \$9001., and sells for \$1000, there is no gain, but a loss of \$8001, which is 88.89+% of \$9001.

The question seems to be as to the meaning of the decimal point following the 1 in the expression $1.\frac{9}{.001}$. A common fraction can not have place value, nor can it give place value as a digit in a number. It is simply added to the number to which it is attached and is a fraction of the unit to which it is attached. If it stands alone it is a fraction of the understood (or named) unit. We would not write $3\frac{1}{4}$ for 354, nor $2\frac{1}{2}$ for 25. Also $4\frac{1}{2}=4+\frac{1}{2}=4.+\frac{1}{2}=4.\frac{1}{2}$. Every in-

teger in our decimal notation is, in theory, followed by a decimal point, and it can make no difference in the meaning of the expression whether the decimal point is expressed or understood. $4.\frac{1}{2}$ must equal 4.5 and not 4.05, which is the equivalent of $4.0\frac{1}{2}$.

$$\text{So } 1.\frac{9}{.001} = 1\frac{9}{.001} = 1 + \frac{9}{.009}.$$

Also solved by COOPER D. SCHMITT, D. A. LEHMAN, ELMER SCHUYLER, and the PROPOSER. These contributors agree that the result is 10333%. To my mind, the solution and discussion of the problem as published above are correct. ED. F.

ALGEBRA.

94. Proposed by J. W. YOUNG, Columbus, Ohio.

$$\text{Solve : } \left[\frac{x^2 + 14x + 1}{p^4 + 14p^2 + 1} \right]^3 = \frac{x(x-1)^4}{p^2(p^2-1)^4}.$$

I. Solution by G. B. M. ZERR, A. M., Ph. D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

$$\text{Let } p^2(p^2-1)^4 = A, (p^4 + 14p^2 + 1)^3 = B.$$

$$\begin{aligned} \therefore Ax^6 + 42Ax^5 + 591Ax^4 + 2828Ax^3 + 591Ax^2 + 42Ax + A \\ = Bx^5 - 4Bx^4 + 6Bx^3 - 4Bx^2 + Bx. \end{aligned}$$

$$\begin{aligned} \therefore Ax^6 + (42A - B)x^5 + (591A + 4B)x^4 + (2828A - 6B)x^3 \\ + (591A + 4B)x^2 + (42A - B)x + A = 0. \end{aligned}$$

$$\begin{aligned} \therefore A[x^3 + (1/x^3)] + (42A - B)[x^2 + (1/x^2)] + (591A + 4B)[x + (1/x)] \\ + (2828A - 6B) = 0. \end{aligned}$$

$$\begin{aligned} \therefore A[x + (1/x)]^3 + (42A - B)[x + (1/x)]^2 + (588A + 4B)[x + (1/x)] \\ + (2744A - 4B) = 0. \end{aligned}$$

$$\text{Let } [x + (1/x)] = y.$$

$$\begin{aligned} \therefore p^2(p^2-1)^4y^3 - (p^{12} + 759p^8 + 2576p^6 + 759p^4 + 1)y^2 \\ + 4(p^{12} + 189p^{10} + 3p^8 + 3710p^6 + 3p^4 + 189p^2 + 1)y \\ - 4(p^{12} - 644p^{10} + 3335p^8 - 1288p^6 + 3335p^4 - 644p^2 + 1) = 0. \end{aligned}$$

$$\text{Let } a = p^2 + 1/p^2.$$

$$\begin{aligned} \therefore (2-a)^2y^3 - (a^3 + 756a + 2576)y^2 + 4(a^3 + 189a^2 + 3332)y \\ - 4(a^3 - 644a^2 + 3332a) = 0. \end{aligned}$$

$$\therefore (y-a)[(2-a)^2y^2 - 4(a^2 + 188a + 644)y + 4(a^2 - 644a + 3332)] = 0.$$